



# USB to Serial 16 COM RS-232/422/485 Rack mount adapter

Model Number: *USB-16COMi-RM*

## Installation Guide

Coolgear, Inc.

Version: 1.0

Date: 04/18/2024



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## Revision History

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Revision	Date	Comments
1.0	04/18/2024	First Release

## 1. Introduction

Thank you for purchasing Coolgear's USB to Serial 16 COM RS-232/422/485 Rack mount adapter. The USB to industrial 16-Port RS-232/422/485 Adapter is designed to make serial port expansion quick and simple. Connecting to a USB port on your computer or USB hub, the USB Serial Adapter instantly adds 16 RS-232/422/485 multi-electrical interface serial communication ports to your system. By taking advantage of the USB bus, the USB-16COMi-RM Adapter makes it easier than ever to add 16 serial ports and serial devices to your system with easy plug-and-play and hot plug features. Adapting the new technology, the serial port expansion now takes the new bus with easy and convenient connectivity.

Plugging the USB 16-Port RS-232/422/485 Adapter to the USB port, the adapter is automatically detected and installed. There are no IRQ & COM port conflicts, since the port doesn't require any additional IRQ, DMA, memory as resources on the system. The RS-232, or RS-422/485, port functions as native Windows COM port, and it is compatible with Windows serial communication applications. Each port is individually configurable. The adapter is designed with external switches to set RS-232, RS-422 or RS-485 ports and different operation modes conveniently. There is no need to open the chassis to set the ports.

The USB Serial Adapter provides instant connectivity to RS-232, or RS-422/485, communication devices for factory automation equipment, multi-drop data collection devices, barcode readers, time clocks, scales, data entry terminals, ATMs and serial communication in a harsh environment. The USB to Serial Adapter is

suitable for remote access, retail and industrial application, data collection and other applications requiring high speed RS-232, or RS-422/485, communication ports.

#### Features:

- ✓ Adds sixteen high speed RS-232/ 422 / 485 serial ports via USB connection.
- ✓ 384 byte receive buffer.
- ✓ 128 byte transmit buffer for high speed data throughput.
- ✓ Requires no IRQ, DMA, I/O port.
- ✓ Data rates: 300 bps to 921.6K bps.
- ✓ Serial Connector: one DB-9 male connector.
- ✓ Auto transmit buffer control for 2-wire RS-485 half-duplex operation.
- ✓ Termination resistors installed on-board.
- ✓ RS-232 data signals: DCD ,RxD ,TxD, DTR,GND,DSR,RTS,CTS.
- ✓ RS-422 data signals: Tx-, Tx+, Rx+, Rx-, GND, RTS-, RTS+, CTS+, CTS-.
- ✓ RS-485 data signals: Tx-, Tx+, Rx+, Rx-(4 wire) and data-, data+ (2 wire).
- ✓ Monitor LEDs of TxD, RxD indicating port status.
- ✓ AC 100V – 240V input for DC 5V, 4A switching power supply .
- ✓ Virtual COM port drivers available for Windows 7, Vista, 2003, XP, 2000

## 2. Power Supply

- Input : AC 100V ~ 240V, 47 – 63 Hz.
- Output : DC 5.0V 4A.

## 3. Hardware Installation

Outside the unit, there are sixteen 4-pin DIP switches which are set to select the mode of operation. You will need to set the switch settings to RS-232 mode, or RS-422, or RS-485 mode as per the requirements of your application.

You need to install the driver first, prior to hardware installation. After the setting of DIP switches and connecting power cord to the adapter, you then plug the adapter to USB port to start driver installation.

The Mode Block Configuration Settings are listed as follows:

SW1 (Port-1), SW2 (Port-2), SW3 (Port-3), SW4 (Port-4)

SW5 (Port-5), SW6 (Port-6), SW7 (Port-7), SW8 (Port-8)

SW9 (Port-9), SW10 (Port-10), SW11 (Port-11), SW12 (Port-12)

SW13 (Port-13), SW14 (Port-14), SW15 (Port-15), SW16 (Port-16)

	Operation Mode	S1	S2	S3	S4
RS-232	Standard RS-232 Mode	OFF	ON	ON	ON
RS-422	4 wire with Handshaking	ON	ON	ON	ON

RS-485	Full Duplex (4 wire)	ON	OFF	ON	ON
	Half Duplex (2 wire) - with Echo	ON	OFF	OFF	ON
	Half Duplex (2 wire) - without Echo	ON	OFF	OFF	OFF

JP5 (Port-1), JP6 (Port-2), JP7 (Port-3), JP8 (Port-4), JP9 (Port-5), JP10 (Port-6), JP11 (Port-7), JP12 (Port-8), JP13 (Port-9), JP14 (Port-10), JP15 (Port-11), JP16 (Port-12), JP17 (Port-13), JP18 (Port-14), JP19 (Port-15), JP20 (Port-16) for Termination and Biasing Option Configuration

Inside the unit, there are sixteen 2 x 7 (14 pin) header blocks which are jumpered to enable Tx, Rx, CTS 120 Ohm termination resistors and Tx, Rx 750 Ohm BIASing resistors.

You will need to open up the metal case and set the jumper setting for RS-422 mode or RS-485 mode as per the requirements of your application. Settings are listed as follows:

Jumper	Function
1-2	Tx Termination of 120 Ohm. This jumper should always be populated for RS-485 mode
3-4	Pull-up Tx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Tx+.
5-6	Pull-down Tx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Tx- .
7-8	Rx Termination of 120 Ohm. This jumper should always be populated for RS-422 mode.
9-10	Pull-up Rx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Rx+
11-12	Pull-down Rx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Rx- .
13-14	CTS Termination of 120 Ohm. This jumper should always be populated for RS-422 mode

Note: Sometimes, when operating in RS-422 or RS-485, it is necessary to configure termination and biasing of the data transmission lines. Generally this must be done in the cabling, since this depends on the installation of connections. Before applying the option, check your cable specification for proper impedance matching.

## 4. Windows 11/10/8/8.1/7/Vista/2003/XP/2000 Driver Installation

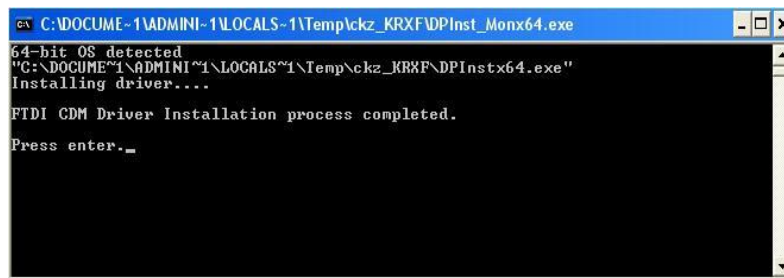
You need to have administrator privileges to install any new drivers under Windows 11/ 10/ 8.1/8/ 7/ Vista/ 2003/ XP/2000. To install the driver or update the configuration please log onto Windows as "Administrator" or ask your system administrator to install the USB-COM driver.

**You need to install the driver first, prior to hardware installation. Do not connect the USB-to-Serial Adapter to the USB port of your computer, before you finish driver installation.**

If your product came with an installation CD -

Please proceed with the following steps to install the driver:

1. Insert the "USB COM Series Driver and Utility" CD into your CD-ROM.
2. The "USB COM Series Driver and Utility CD" dialog box appears.
3. Under "Driver Installation", double click "Windows 11,10,8.1,8, 7, Vista, 2003, XP, 2000 driver" to install the device driver.
4. The USB COM install program will auto-detect the OS type and install the driver automatically. (Note: in Windows 7 or Vista OS you will find another dialog box, please click on "OK" to confirm the drivers install program).



5. After the message "FTDI CDM Driver installation process completed" appears, press "Enter" to complete the driver installation.
6. Plug in the USB to Serial Adapter to the USB port of your computer. Windows will finish installing the driver files.

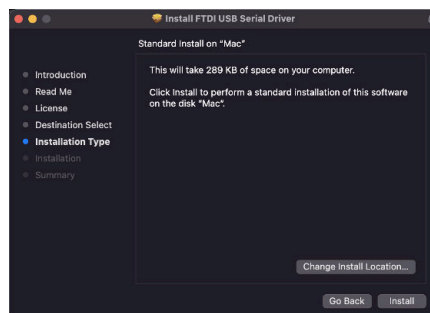
If your product did not come with an installation CD, download the drivers for the product available at: <https://www.coolgear.com/files/FTDI-Latest.zip>

1. Download and extract the FTDI-Latest folder to your desktop or another appropriate location
2. Navigate to the appropriate folder corresponding to your OS
3. Run the setup executable (.exe) to complete the guided installation.

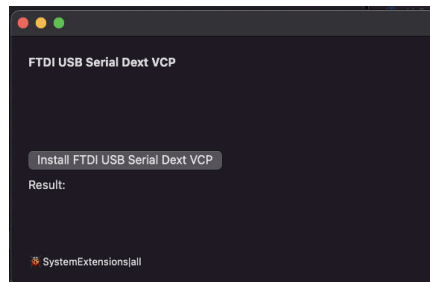
## 5. Mac OS Driver Installation

\*\* Notice : Mac OS has pre-installed VCP drivers depending on OS version, go to the “Check installation” section and confirm the device is not already functioning before proceeding with these steps.

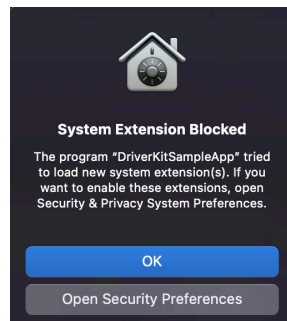
1. Download the FTDI-Latest file package from <https://www.coolgear.com/files/FTDI-Latest.zip>.
2. Open the archive and navigate to FTDI-Latest/MacOS and select the appropriate folder corresponding to your OS version, extract the contents of the folder to your desktop or another location.
- 3a. If you are using one of the versions with a .dmg file, run the .dmg and follow the installation instructions



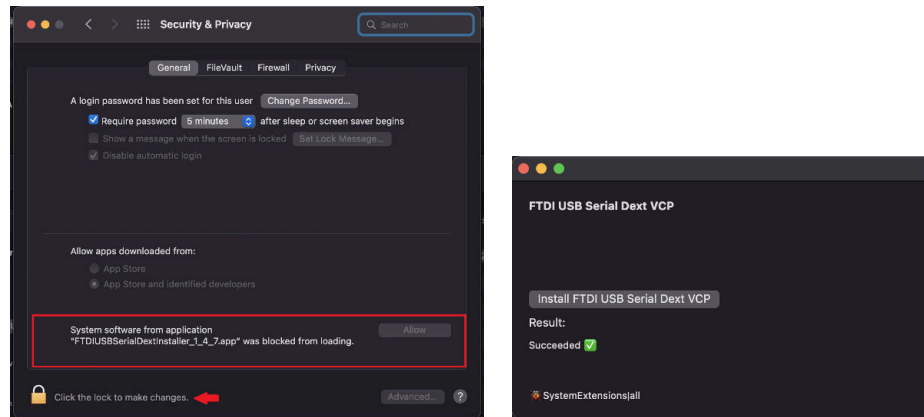
- 3b. If you are using the 10.15 - 12 version, the file is a “.app” file. This file needs to be moved into the mac’s /Applications folder. Once moved, run the .app file from the folder. You will see a window like the one below.



4. Click on “Install FTDI USB Serial Dext VCP” You will see a dialog box appear like the one below. Click on “Open Security Preferences”



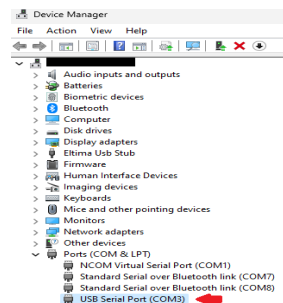
5. You will need to unlock the settings to make changes, and then click on “Allow” to allow the program to install the necessary system extension. Once completed, you should see the installer report a “Succeeded” message. Restart your computer, and the drivers are now installed and you may use your adapter.



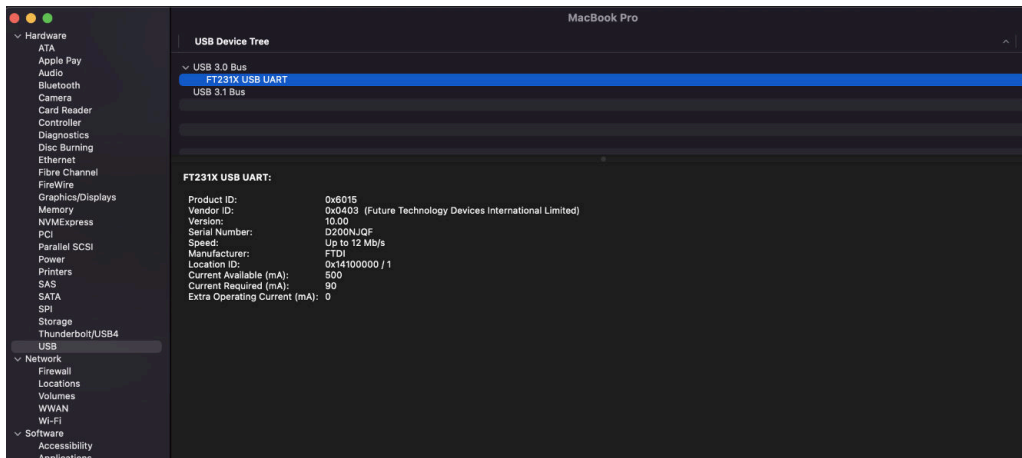
## 6. Check Installation

You can now verify the installation has been completed successfully by looking under Device Manager of the System Properties screen. (Go there by Start-Setting- Control Panel-System Properties-Hardware-Device Manager.

The device should have been installed as a "USB Serial Port (COMx)" attached to "USB Serial Converter (A/B or A/B/C/D)".



Mac Specific : Open “System Report” and navigate to the “USB” section of the tree. You should see a device labeled as “FT\*\*\*” or “USB UART” with the manufacturer“FTDI “. This is your serial adapter, if it appears here, the device is installed and should function normally.



## 7. Change COM Port Properties & COM Port Number

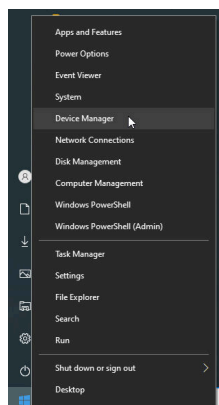
This feature is particularly useful for programs, such as HyperTerminal, which only work with COM1 through COM4. Please ensure that you do not change the COM Port Number already in use.

To change the virtual COM port properties:

- Select the "USB Serial Port" • Click "Properties".
- Select "Port Setting" and "Advanced".
- Click the drop down arrow on COM Port Number and scroll to the required COM port. Select "OK".
- Return to the Device Manager Screen. You will see that the USB Serial Port installation has been changed to the new COM Port Number.

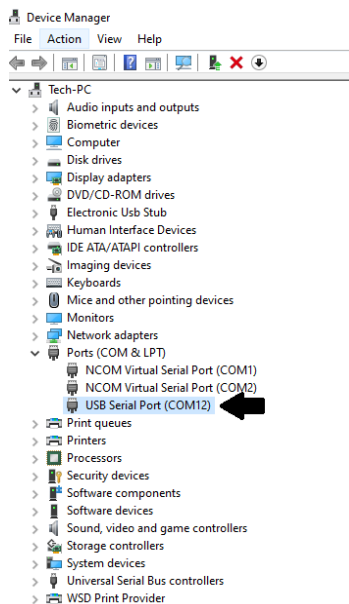
## 8. Uninstalling Windows 7/8/8.1/10/11 Drivers

1. The USB to Serial Devices must be connected to the PC.
2. Right click on the windows icon / start button
3. Click on "Device Manager" in the menu
4. \*\*Alternative method – Search "Device Manager" in the start menu / search bar and open Device Manager

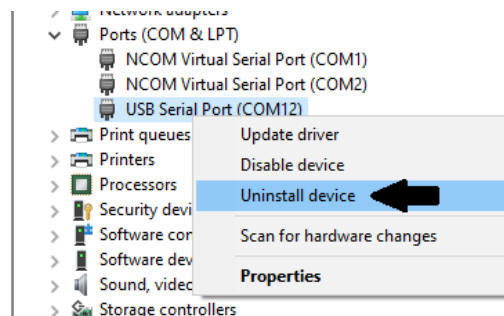




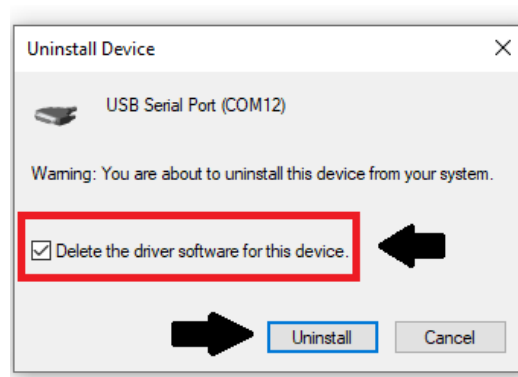
5. Locate your device under the “Ports (COM & LPT)” section of device manager.



6. Right click on the device, and select “Uninstall Device”

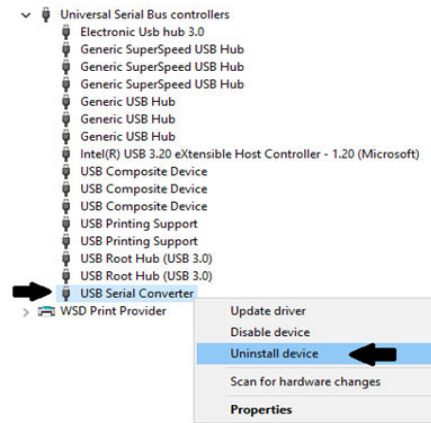


7. Select “Delete the driver software for this device” in the Uninstall prompt, and click “Uninstall”



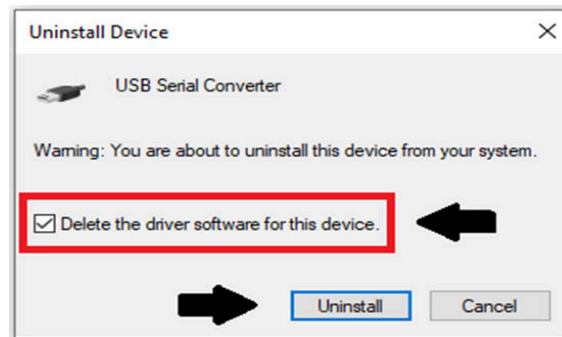
Note : If you have more than one USB Serial Port installed in your PC, you need to repeat steps 5-7 to delete the driver software for each port.

8. Locate your device under the “Universal Serial Bus Controllers” section of device manager



9. Right click on the device, and select “Uninstall Device”

10. Select “Delete the driver software for this device” in the Uninstall prompt, and click “Uninstall”



## 9. Pinouts

Note : If you have more than one USB Serial Converter installed in your PC, you need to repeat steps 8 - 10 to delete the driver software for each converter.

### RS-232 Signal Pin-outs of DB-9 Male

Pin 1	DCD
Pin 2	RxD
Pin 3	TxD
Pin 4	DTR
Pin 5	GND
Pin 6	DSR

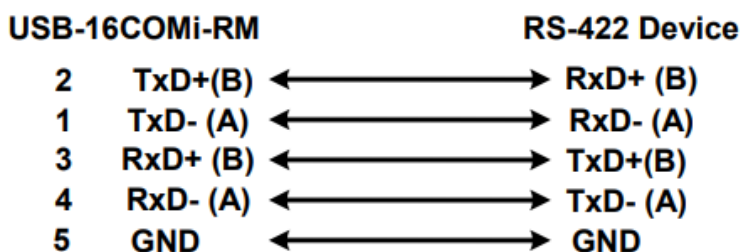
Pin 7	RTS
Pin 8	CTS
Pin 9	-

## RS-422 Signal Pin-outs of DB-9 Male

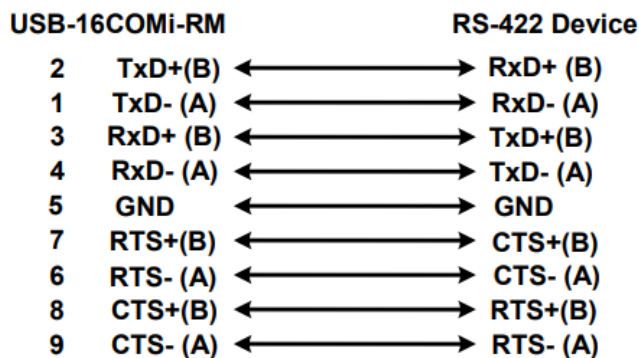
Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND
Pin 6	RTS- (A)
Pin 7	RTS+(B)
Pin 8	CTS+(B)
Pin 9	CTS- (A)

## RS-422 Signal Wiring

- Point-to-Point 4 Wire Full Duplex



## RS-422 with Handshaking



## RS-485 4-Wire (Full duplex) Signal Pin-outs of DB-9 Male

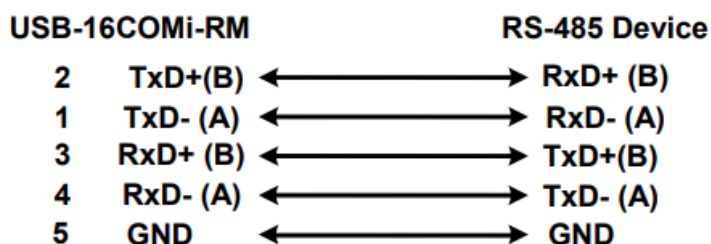
Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	Rx-(A)
Pin 5	GND

## RS-485 2-Wire (Half duplex) Signal Pin-outs of DB-9 Male

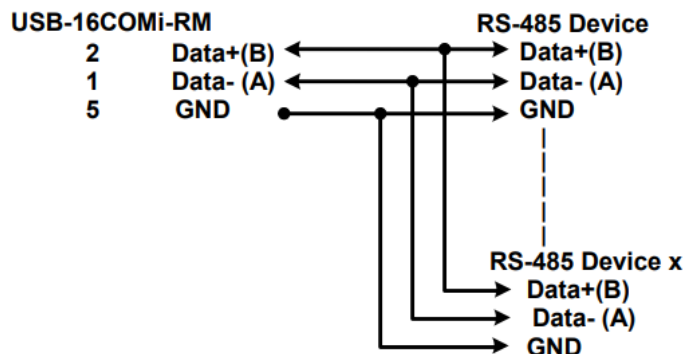
Pin 1	Data- (A)
Pin 2	Data+(B)
Pin 3	GND

## RS-485 Signal Wiring

- Point-to-Point 4-Wire Full Duplex



## Multidrop RS-485 2-Wire Half-duplex



## 10. Specifications

### USB Bus

Compliance	USB 2.0 Full Speed, USB 1.1 compliant
Speed	480Mbps, hi-speed USB
Connector	USB type B
Fifo	2k bytes transmit and receive
Operating Systems	<ul style="list-style-type: none"><li>• Supports Windows XP to 11, Server 2000 to Server 2022 (WHQL certified)</li><li>• Supports Linux Kernel 3.0 and above</li><li>• Supports Mac OS X 10.3 and above, driver signed by Apple</li></ul>
Installation	The driver is already installed (Linux), or automatically downloading and installing device drivers after Device connection (Windows).

### Serial Interface

Interface	RS-232/422/485
Number of Ports	16
Connector	DB9 male
Max Speed	RS-232:up to 1Mbps RS-422/485:up to 10Mbps
RS-232 Signals	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422 Signals	TxD-, TxD+, RxD+, RxD-, GND, RTS-, RTS+, CTS+, CTS-
RS-485 Signals (4 wire)	TxD-, TxD+, RxD+, RxD-, GND
RS-485 Signals (2 wire)	Data-, Data+, GND
Protection	15kV ESD protection for all signals

**Serial Communication Parameters**

Data Bits	7, 8
Parity	None, Even, Odd, Mark, Space
Stop Bit	1, 2
Flow Control	Hardware (RTS, CTS), XON/XOFF

**Power**

Power Input	DC 5V, 3A external power adapter
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**Mechanical**

Casing	SECC metal chassis suitable for DIN rail mounting Rack-mounting brackets included
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**Environmental**

Operating Temperature	0°C to 60°C (32°F to 140°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Operating Humidity	0% to 80% RH
Safety Approvals	CE, FCC

## Contact Us:

Coolgear Inc.

5120 110th Avenue North

Clearwater, Florida 33760 U.S.A.

**Toll Free:** 1 888-688-2188

**Local:** 1 727-209-1300

**Fax:** 1 727-209-1302

### Safety

- Read the entire Installation Guide before implementing this product for your application. This guide contains important information about electrical connections that must be followed for safe and proper operation.
- Inspect the product closely for visual defects before putting it to use.
- Keep away from areas where moisture builds, this product contains electrical components that can be damaged by moisture build up, this can adversely affect your equipment connected to it.
- Do not disassemble the product. Handling the product's internal components can expose it to ESD (Electro-Static Discharge) hazards that can affect the function of the device.
- If this product is not functioning properly, email our support team at [support@coolgear.com](mailto:support@coolgear.com).

## USB CHARGING & CONNECTIVITY EXPERTS

### Within Every Great Machine

For over 20 years our rugged, off-the-shelf USB hubs, chargers, and serial products are ready to go for your next project. Based in the US, Coolgear has successfully engineered and deployed millions of connectivity solutions into industrial, medical, automotive, commercial, and aerospace industries.

We understand the importance of reliability, build quality, & consider all our customers' applications as critical, wanting to ensure long-lasting event-free integrations.

#### Compliance Statement

View compliance within the product's respective Technical Data Sheet, found on the product's online listing.

#### Technical Support

When you reach out to Coolgear support, you'll find yourself in the hands of a solution-oriented and knowledgeable expert ready to answer whatever question you throw at them. If you ever need help with your product, visit [coolgear.com/support](http://coolgear.com/support) for support tickets, downloads, and other support resources. For the latest drivers, please visit [coolgear.com/download](http://coolgear.com/download).

**Product Standard Warranty**

One (1) Year Warranty from Date of Purchase Invoice. Coolgear will repair or replace any Product determined to be defective and which has been returned, at your risk and expense, to Coolgear. Where Coolgear determines in its sole judgment that repair or replacement of such Product is not reasonable, Coolgear will keep the non-conforming Product and refund to you the amount you paid for such Product. Returned Products shall be subject to the balance of the Warranty Period otherwise applicable. Any reconditioned parts used by Coolgear shall be subject to all the same provisions as otherwise applicable to new parts. THE FOREGOING DESCRIBES COOLGEAR'S SOLE LIABILITY, AND YOUR SOLE REMEDY, FOR ANY BREACH OF WARRANTY. IF YOU DO NOT AGREE WITH THE TERMS OF THIS LIMITED WARRANTY, YOU MUST RETURN THE PRODUCTS UNUSED AND IN THEIR ORIGINAL CONTAINERS TO YOUR ORIGIN OF PURCHASE.

**Limitation of Liability**

This Limited Warranty does not cover: (i) defects or damages resulting from natural causes, casualty, accident, misuse or abuse, neglect, alterations, service or repair by other than Coolgear, including without limitation by you; (ii) improper installation or de-installation, operation or maintenance, improper connections with peripherals or other causes not arising out of defects in the materials or workmanship of Products; (iii) any Product for which the warranty sticker has been removed, modified or defaced; (iv) normal wear and tear; (v) damage to or loss of repaired or replaced Products during shipping by Coolgear except when such damage or loss is caused by poor or inadequate packaging by Coolgear; or (vi) Products purchased outside the United States. UNDER NO CIRCUMSTANCES WILL COOLGEAR BE LIABLE FOR ANY LOSS OF USE, INTERRUPTION OF BUSINESS OR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND (INCLUDING LOST PROFITS) REGARDLESS OF THE FORM OF ACTION WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT PRODUCT LIABILITY OR OTHERWISE, EVEN IF COOLGEAR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE TOTAL LIABILITY OF COOLGEAR HEREUNDER EXCEED THE GREATER OF \$50.00 OR THE AMOUNT YOU ACTUALLY PAID FOR THE PRODUCT GIVING RISE TO SUCH LIABILITY, REGARDLESS OF THE CAUSE OF ACTION, IN CONTRACT, TORT, STRICT LIABILITY OR OTHERWISE. NOT ALL JURISDICTIONS ALLOW SUCH LIMITATIONS OF DAMAGES SO THE FOREGOING LIMITATIONS MAY NOT APPLY TO YOU.

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